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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,111	04/09/2004	David Karl Bidner	FGT 335CON (81100062)	1714

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EXAMINER

NGUYEN, TU MINH

ART UNIT PAPER NUMBER

3748

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/822,111

Applicant(s)

BIDNER ET AL.

Examiner

Tu M. Nguyen

Art Unit

3748

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22 and 23 is/are allowed.
- 6) ☒ Claim(s) 18-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892).
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. An Applicant's Request for Continued Examination (RCE) and an Applicant's Amendment filed on May 19, 2005 have been entered. Claims 21 and 23 have been amended. Overall, claims 18-23 are pending in the application.

Drawings

2. The formal drawings filed on November 26, 2004 have been approved for entry.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. in view of Miyata et al. (U.S. Patent 6,214,207).

Re claim 18, as illustrated in Figures 1-3, 5, and 6, Suzuki et al. disclose an emission control system for an internal combustion engine, comprising:

- a NO_x absorbent (7) disposed in an exhaust passage of the internal combustion engine that stores and reacts NO_x under certain operating conditions;

- a NOx sensor (33) and a downstream air-fuel ratio sensor (31) disposed in the exhaust passage downstream of the NOx absorbent, an output of the NOx sensor (33) corresponding to a NOx concentration of exhaust gas flowing out of the NOx absorbent and an output of the downstream air-fuel ratio sensor (31) corresponding to an oxygen concentration of exhaust gas flowing out of the NOx absorbent; and

- a controller (30) calculating an operating condition of the internal combustion engine and determining (step 511) a difference (NSOFF) of the output value (VNOX) of the NOx sensor from a predetermined value (VNOXo which is corresponding to zero NOx concentration) when preselected engine operating conditions are met (step 501 with YES answer; lines 11-19 of column 12) and determining degradation of the NOx sensor based on the difference determined during the preselected conditions (if NSOFF is greater than zero (a threshold degradation value), the controller determines that the sensor is degraded and corrects the output of the sensor (step 609)).

wherein the controller further indicating whether predetermined engine operating conditions are present (steps 601 and 611 with YES answer), and in response to the determination, adjusting a fuel injection amount into the internal combustion engine based on the output of the downstream air-fuel ratio sensor (31) (step 613, line 57 of column 13 to line 5 of column 14, and lines 3-17 of column 11).

Suzuki et al., however, fail to disclose that a dual signal NOx sensor is used in place of the NOx sensor (33) and the downstream air-fuel ratio sensor (31).

Miyata et al. teach and suggest the use of a dual signal NOx sensor (2) to replace a single signal NOx sensor and an air-fuel ratio sensor, both of which are located downstream of a NOx catalyst (lines 16-51 of column 2). This dual signal NOx sensor provides accurate measurements of NOx concentration and oxygen concentration in the exhaust gas. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have replaced the NOx sensor (36) and the air-fuel ratio sensor (33) of Suzuki et al. with the dual signal NOx sensor of Miyata et al., since the application thereof would have provided a less complex exhaust gas purification system by eliminating the downstream air-fuel ratio sensor (33) in Suzuki et al.

Re claim 19, the modified system of Suzuki et al. further comprises a three-way catalyst (5a) disposed in the engine exhaust passage upstream of the NOx absorbent.

Re claim 20, the modified system of Suzuki et al. further comprises an air-fuel ratio sensor (29) disposed in the exhaust passage of the engine upstream of the NOx absorbent.

Re claim 21, in the modified system of Suzuki et al., the controller (30) further changes engine operation from a lean air-fuel ratio to a stoichiometric or rich air-fuel ratio based on the output of the NOx sensor (see steps 611 and 613).

Allowable Subject Matter

5. Claims 22-23 are allowed.

Response to Arguments

6. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are not persuasive.

In response to applicant's argument that the combination of Suzuki et al. and Miyata et al. is improper because the references fail to disclose or suggest "adjusting a fuel injection amount into the internal combustion engine based on the output of the downstream air-fuel ratio sensor" (pages 8-9 of Applicant's Amendment), the examiner respectfully disagrees.

The text on line 57 of column 13 to line 5 of column 14 in Suzuki et al. reads "*If NOS \geq VNOX1 (meaning that the reactivating operation is needed), the ECU 30 proceeds to step 613, in which the ECU 30 sets the value of a reactivating operation execution flag XRS to "1". The ECU 30 then ends the routine.*

If the value of the reactivating operation execution flag XRS is set to "1", the operational air-fuel ratio of the engine 1 is switched to a rich air-fuel ratio for a predetermined length of time and then returned to a lean air-fuel ratio by another routine (not shown) of the ECU 30. When the air-fuel ratio is returned to a lean air-fuel ratio, the value of the reactivating operation execution flag XRS is reset to zero. Through this rich spike operation, NOx stored in the NOx-absorbing and reducing catalyst device 7 is released from the catalyst device 7, and then reduced by the HC and CO components of exhaust gas of a rich air-fuel ratio."

The text on lines 3-17 of column 11 of Suzuki et al. reads "*Therefore, if the NOx-absorbing and reducing catalyst device 7 deteriorates so that the amount of NOx that can be stored in the NOx-absorbing and reducing catalyst device 7 decreases, the theoretical air-fuel*

ratio maintaining duration after the start of the reactivating operation becomes shorter.

Therefore, it is also possible to monitor the exhaust air-fuel ratio at the downstream side of the NOx-absorbing and reducing catalyst device 7 through the use of the downstream-side air-fuel ratio sensor 31 after the start of the reactivating operation while the engine is being operated under a constant condition and to determine that the NOx-absorbing and reducing catalyst device 7 has deteriorated, when the theoretical air-fuel ratio maintaining duration becomes shorter than a predetermined value.”.

In the above text, when step 611 is YES, Suzuki et al. switch the engine air-fuel ratio at step 613 to rich of stoichiometry to start the reactivating operation to purge the stored NOx in the NOx-absorbing and reducing catalyst (7). During this reactivating operation, the downstream air-fuel ratio sensor (31) is monitored to at least determine if the catalyst (7) has deteriorated. This is done by measuring a theoretical air-fuel ratio maintaining duration provided by the downstream sensor (31). It is also obvious to one with ordinary skill in the art that Suzuki et al. also utilize this theoretical air-fuel ratio maintaining duration to terminate the rich engine air-fuel ratio since the end of this theoretical air-fuel ratio maintaining duration signals a rich break through of the catalyst and that the catalyst is completely purged of stored NOx. One with ordinary skill in the art also realizes that during the rich engine air-fuel ratio, a fuel injection amount in Suzuki et al. is increased while an intake air amount is kept constant in order to maintain a required engine torque for good vehicle drivability.

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Prior Art

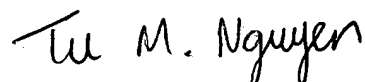
7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of two patents: Kurokawa et al. (U.S. Patent 6,295,862) and Kurokawa et al. (U.S. Patent 6,442,998) further disclose a state of the art.

Communication

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TMN

May 30, 2005

Tu M. Nguyen

Primary Examiner

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